Biocoloniality, governance, and the protection of 'genetic identities' in México and Colombia

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Abstract

In this paper two case studies are compared, Mexico and Colombia, in which the protection of 'genetic identities' has generated political and legal systems designed to avoid the unlawful appropriation of biological material and/or DNA in Latin America. The very idea that genetic patrimonies belong to nation-states or ethno-racial groups —framed as genomic sovereignty or the protection of a disappearing indigenous genetic heritage— is the product of a genetically reified understanding of human diversity, which we identify as 'biocoloniality'. By exploring the common tropes and imaginations with which biocoloniality has been articulated, we argue that governance mechanisms built around 'genetic identities' are ineffective in addressing the unequal power relations inherent in contemporary scientific and regulatory practice.

Keywords: biocoloniality, race, genetic identities, genomic sovereignty, Colombia, Mexico.

Introduction

The idea that genomic and genetic technologies offer new ways to characterise the biological 'uniqueness' of individuals and populations, has been rapidly incorporated into the managerial and regulatory practices of fields as diverse as forensics, law and medicine. By the same token, 'genetic uniqueness' has firmly entered into the legal mechanisms designed to protect the commercially valuable and/or endangered human genetic patrimony of 'developing countries', 'ethnic minorities' or 'the global south' against emerging biocolonial threats (Seguín et al. 2008; Hardy et al. 2008). In this paper we argue that the idea that genetic patrimonies 'belong' to nation-states or ethno-racial groups is the product of a genetically reified framing of human diversity, which may be open to racialised conceptions. This is a process that we have named biocoloniality, which is a notion that emerges both from the literature on coloniality (Quijano 2000) and biopolitics (Foucault 2007).

The Peruvian sociologist Aníbal Quijano (2000) coined the concept of 'coloniality of power' to bring into focus the relationships between power and the contemporary constitution of the world-system, which has configured the labour force, its geographies, knowledge and subjectivities along racialised lines. Racialisation is a central element in Quijano's analysis of coloniality, since it provides the historical basis on which relations of domination became naturalised from the sixteenth century onwards, first in the Americas and then globally. Quijano argues that over the span of three hundred years the imposition of racial *taxa* amalgamated a multitude of different groups (e.g. Mayans, Aztecs, Chibchas) into one category (e.g.. Indians), producing at once the legitimating logic for specific forms of labour —such as serfdom for Indians, or slavery for Blacks— fundamental for global capitalist accumulation, and a new 'modern' perspective of knowledge "within which non-Europe was the past, and because of that inferior, if not always primitive" (2000: 552). According to Quijano, Cartesian thought established a strict dualist ontology that separated body/nature/object from reason/subject, allowing for a version of Eurocentrism in which some (non-European) races were seen as closer to nature, and were therefore suitable to become objects of knowledge and of domination and exploitation (Quijano 2000:555). On this view, modernity is inextricably associated with —and mutually constitutive of— coloniality. Moreover, racialisation,

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including its modern variants, has proved to be more durable than the colonial matrix in which it was established, producing new and sometimes more subtle power mechanisms in which the old dichotomies between coloniser and colonised no longer apply. Therefore, coloniality should be understood as a much more complex phenomenon than colonialism, one that indeed extends to the present, operating through civilisatory *dispositifs,* with both ontological (coloniality of being) and epistemological (coloniality of knowledge) dimensions, bringing forth different kinds of Eurocentrism (Mignolo 2001). One of the ways in which such mechanisms operate is by mobilising and privileging histories of colonial domination or linear ideas of progress to understand the present. But they are also apparent whenever human diversity is organised along a racial axis.

Building on this theoretical perspective, Juan Camilo Cajigas (2007) proposed the concept of 'biocoloniality of power', understood as: "the current production of nature under the framework of post-Fordist capitalism" (2007:169). However, we suggest that this concept needs further elaboration, by paying closer attention to how the Foucauldian notion of biopolitics (Foucault 2007) intersects with and operates through a colonial matrix of power (Quijano 2000). Biocoloniality recovers how elements of coloniality are constitutive of the scientific making of populations, producing 'genetic identities' (especially those linked to existing discourses of race and nation) which are understood as being in need of protection and/or preservation from capitalist expropriation or the unruly circulation of biocapital (Sunder-Rajan 2006). In the present paper, we argue that, despite its apparent emancipatory promise, the creation of 'genetic identities' and the legal schemes designed to protect them —crafted at the cross roads of science and politics— necessarily reintroduces and reinforces racialised-modern dualisms, and with them elements of coloniality.

In defining biocoloniality in this way, two further points should be borne in mind. First, as many geneticists have argued, genetically unique populations do not exist prior to their description by scientists, which necessarily involves social and political presuppositions and assumptions. On the one hand, human populations are not discrete biological entities, but are genetically continuous with one another; on the other, genomic analysis of any two arbitrarily demarcated groups will yield statistically significant allelic differences (Duster 2005). Consequently, we need to look beyond the prowess of genetic technologies to understand why claims are made about 'uniqueness' or the boundaries of populations. This is borne out by Amy Hinterberger's (2012) analysis of Canadian genomics and the scientific mobilisation of Quebec's founding population, which provides a vivid account of how the "uniqueness" of that population emerged from research driven by European venture capitalists and disseminated by research groups linked to Canadian funding agencies, which depended on enrolment of different types of census categories and registers of national-colonial history. Hinterberger's account of how this genetic population acquired meaning at the nexus of empire, census and multicultural policies in Canada is consistent with our concept of biocoloniality.

Secondly, the concept of bio*coloniality* differs from recent critiques of bio*colonialism* in a key respect. Accounts of bio*colonialism* suppose that, "with molecular genetics, a unique type of identification and differentiation has come about in which individuals and populations can be uniquely analyzed and regulated" (Thacker 2005: 163-164). The literature on biocolonialism thus supposes a discontinuity with older forms of colonialism and a 'new' biocolonialism brought forth by molecular genetics. By contrast, the concept of bio*coloniality* draws on Foucault's observation that biopolitics have always been about the management and exploitation of the life of populations. On this view, claims about novel forms of biocolonialism in the global south do not emerge solely because of the novel molecular capacities of our age; rather, they are themselves the product of the overlap of different notions of modernity, nationhood and colonial awareness, enacted according to the exigencies of different political environments.

In the present paper, we explore and illustrate the workings of biocoloniality through two case studies—Mexico and Colombia— in which the articulations between nationhood, ethno-racial difference, and genetics became the grid of intelligibility on which scientific research, alongside political disputes over 'new types' of colonialism, were plotted. First, we describe a scientific project known as The Human Expedition (1988-1994) that sought to uncover a "deep" Colombia made of isolated populations threatened by globalisation and *mestizaje* (roughly, cultural and racial mixture).

Drawing on documentary sources and archival research, contextualised by insights from individual and group interviews including with those involved in the HE project, we argue that although the Human Expedition (HE) had a strong humanist and multiculturalist orientation (Wade *et al.* 2014, chapter 8) and had no intentions to make commercial profits, its discourse on "salvage genetics" unleashed a confrontation between NGOs, indigenous communities, and scientists. This controversy ultimately led to the demise of the HE and to legal reforms for the protection of the 'genetic material of ethnic minorities', due to allegations that geneticists had misused ethnic minority samples in order to obtain commercial profit.

In the case of Mexico, we explore the institutionalisation of the Mexican Institute of Genomic Medicine (INMEGEN). This case study is based on more than two years (August 2008-November 2010) of participant observation at INMEGEN's Ethical Legal and Social Issues (ELSI) Centre and its Population Genomics Laboratory (PGL), and on semi-structured interviews with key actors in the Mexican genomics arena: policy makers, genomic scientists, NGOs and public critical voices. We show how mobilisation of the notion of 'genomic sovereignty' fuelled a national law of health (D.O.F. 2008) to protect "The Mexican Genome" from "unscrupulous capitalist interests" (D.O.F. 2001), as well as an international policy agenda to defend the genetic patrimony of the global south (Hardy *et al.* 2008).

Genealogical analysis of these two contrasting cases is especially valuable for understanding the workings of biocoloniality for two reasons. First, while the HE was the earliest large scale-national population genetics project in Latin America, it was ultimately unsuccessful in securing indigenous samples. By contrast, in Mexico 20 years later it was possible to create one of the largest population genetics project in the global south, despite criticism coming from the same international NGO and local indigenous groups as objected to the HE. Secondly, while the concept of *mestizaje* plays a preponderant role in the constitution of national imaginaries in both countries, differential articulations of genetics, nation, race and *mestizaje* (see Wade *et al.* 2014) materialised in divergent regulations designed to avoid the unlawful acquisition of 'national' DNA in Mexico, or 'ethnic' genetic material in Colombia. This allows us to flesh out the complex interplay between collective (geneticised) identities, national imaginaries and political possibilities that characterises biocoloniality across different settings.

Drawing on this analysis, we conclude by proposing that instead of creating laws that fix 'genetic identities' in need of protection, Latin American countries, as well as the global south, should start developing governance mechanisms that respond to: 1) the global and local production of genetic knowledge; 2) the technical and ethical impossibility of isolating the 'genetic uniqueness' of any population in the world; and 3) the lack of robust policies and institutional mechanisms to deal with the huge socio-economic asymmetries that still characterise many of the countries in the global south.

The Human Expedition: Colombia and the genetic search for a 'deep' nation (1988-1994)

> The Human Expedition 1992 […] seeks to identify the genetic foundation that defines the Amerindian, black, and *mestizo* races that inhabit our territory, as well as the ethnography of the Colombian man (Gómez 1992: 10).

The project known as the Expedición Humana or Human Expedition (HE) was one of the milestones of genetic research in Colombia. This project, which lasted from the end of the 1980s through the first half of the 1990s, sought to explore the diversity of the Colombian population, not only in terms of molecular genetics but also in relation to cultural aspects. What began as a population genetics project undertaken by a small group of experts turned into a large, interdisciplinary research and medical/social service program, known first as the Human Expedition 1992 (1988-1992) and then as the Great Human Expedition (GHE, 1993-1994). Entirely funded by the Pontificia Universidad Javeriana (PUJ), the program consisted of 'expeditions' to marginal areas to visit certain 'isolated communities' (many of which were indigenous) in an effort to undertake a series of genetic studies that, almost always, were accompanied by a medical and dental team that provided free care. The central premise of the program was articulated in terms of knowing and valuing the 'diversity' of the 'Colombian population' —especially its indigenous and black communities —and although the genetic component was at the centre of its objectives, it was not the only research aspect considered:

> The Fifth Centenary of the Encounter of Two Worlds was key to take an important step forward in the Human Expedition in order to make better sense of all the knowledge that has been acquired over these years, turning Colombia's attention to the situation that our isolated communities live in, and looking for sources of solutions to some of their most important needs. For this, we have planned a Great Human Expedition that will cover all the previously visited territories in order to continue our research process, to enable our isolated communities to find interlocutors that can aid them in their process of self-empowerment, and to produce a graphic archive that will give other Colombians a clear idea of their multi-ethnicity (Bernal 1990: 2).

The GHE disseminated the idea that the Colombian nation needed to learn about population groups with relatively uncontaminated gene pools. This "deep" Colombia stood in contrast to another unmarked, mainstream—implicitly *mestizo*—nation. For the scientists of the GHE, indigenous genetic diversity was at great risk of disappearing due to the attacks of the contemporary world's technological transformations and the accelerated *mestizaje* (biological and cultural admixture) affecting these 'isolated communities'. This approach provided the grounding on which scientific initiatives such as the GHE and the creation of an "Amerindian" blood-bank were mobilised: "The conservation of all of this biological patrimony is truly urgent, given that the various ethnic groups run the risk of being diluted amidst the progressive *mestizaje* of these cultures" (PUJ 1992: 16). The following citation from a research proposal presented by the IGH- PUJ provides another vivid example:

> It is no mystery that the populations that inhabited our continent before Columbus's arrival have gradually become extinct, whether through acculturation and incorporation into cities and towns, or due to the high morbidity and mortality of infectious diseases and malnutrition that followed the disruption of their habitat wrought by 'white' *colonos* (settlers). The medical and genetic study of these populations is therefore urgent, and this becomes even clearer when we consider that indigenous settlements in other parts of the continent have been the object of these kinds of studies for over twenty years while nothing similar has been carried out in Colombia. (Bernal 1991: 3)

This 'salvage genetics' was heir to the anthropological anxiety of the mid twentieth century, which was concerned with the seemingly evident disappearance of traditional indigenous groups. This anxiety was the driving force behind countless 'salvage ethnographies' that, in the name of science and humanity, sought to preserve a proper account of those populations that were allegedly disappearing. In anthropology, this discourse was deeply questioned in light of the resilience and even resurgence of indigenous groups, but in the Human Expedition it re-emerged as an argument that substantiated the need for clinical and population genetics research. As a consequence, genetic

research became part of an effort to unveil and protect the biological diversity of the Colombian nation (cf. Restrepo, Schwartz-Marin & Cardenas 2014).

In the 1990s, an international NGO named the Erosion Technology and Concentration (ETC) group (formerly called Rural Advancement Foundation International, RAFI), devoted to restricting the appropriation of the biological resources of the global south, became interested in the HE. In general terms the ETC frames its endeavour as a constant struggle against biopiracy (a term coined by Pat Mooney, ETC's CEO, in 1993), understood as:

> the use of intellectual property systems to legitimize the exclusive ownership and control of biological resources and knowledge, without recognition, compensation or protection for contributions from indigenous and rural communities [...] thus bioprospecting cannot be considered anything but biopiracy (Pat Mooney in Delgado, 2002: 299).

The ETC has been quite the global actor. In the 1990s this NGO disputed the patenting of the Hagahai cell line (Anderson 2012), and at the same time helped in the organisation of indigenous groups opposing The Human Genome Diversity Project (HGDP) in the US and the HE in Colombia. The HGDP deserves special mention, since it was an international endeavour which aimed to look for genetic variation in 'isolated populations', mostly indigenous groups around the world, in order to preserve the history of humanity through indigenous DNA. The way in which its promoters approached the topic of preservation of indigenous DNA generated an international controversy in which indigenous communities thought they were being treated as relics faced with extinction, rather than human communities facing serious medical and socioeconomic challenges. The disputes with the ETC and indigenous groups finally paralysed the HGDP (see Reardon 2005; M'charek 2005).

Although the HE struggled to avoid being linked to the HGDP, very similar political disputes haunted them, since both projects endorsed a 'salvage genetics' discourse. In 1996 the ETC group and Senator Lorenzo Muelas — who was at the time an indigenous representative— accused the GHE of sending indigenous blood samples to US institutions without proper informed consent. The public precedent for this accusation was a documentary film first shown on BBC in 1994, titled *The Gene Hunters.* In this film GHE members were portrayed as intermediaries for the collection of indigenous blood samples, sending the samples to foreign institutions with economic interest in them (Ramos 2004: 24) - an portrayal that the GHE scientists systematically denied.

One of the implications of *The Gene Hunters* was that private interests would commercialise indigenous samples in ways that could ultimately harm indigenous people in Colombia (see Ramos 2004, Barragán 2011). Consequently, the ETC group and indigenous representatives demanded the return of samples collected by the HE, since according to them, indigenous communities were being used as raw material for a new colonial era in which genes were being patented to gain commercial profit. For their part, indigenous representatives thought that the challenges they faced had nothing to do with the stated commitments of the HE — to empower them and make them visible to others — but rather stemmed from efforts to make them objects of western knowledge, which in their view had been historically used to systematically plunder their resources:

> The problem of our people is not that we are hidden, our problem is economic exploitation, political oppression and cultural denial; it is the problem of gigantic poverty, not because we have always been poor, we have rather been impoverished by them through a systematic plundering of all our patrimony. Besides, our experience tells us that simply knowing the other, does not guarantee its respect, because knowledge can be, and in fact it has been, the foundation for a better exploitation, an experience from which we cannot exclude those that claim to act under Christian values. We should not forget that it is precisely in the name of that moral and those Christian values that the toughest blows

> have been given to our thoughts, institutions and customs (Muelas and Green 1996- indigenous representatives).

Although almost twenty years have gone by and the accusations made against the HE were unfounded, these public controversies left a mark in the tacit protocols and legislation regulating research with indigenous communities in Colombia. These included the law 599 of 2000, which sanctioned with 1 to 5 years of jail "any manipulation of genes without free and informed consent" (Barragan 2011: 46).

The history of the HE and its aftermath vividly illustrates the workings of biocoloniality. This is apparent in the HE's scientific imagination, which clearly located indigenous people's DNA in a pre-modern past, and which sought to create a biobank to protect it from dilution by the modern forces of globalisation and admixture. But biocoloniality also shaped critical as well as scientific discourses: it was by invoking colonial history (rather than actual practices of commercial exploitation) and reinforcing modern-racialised dualisms (including the idea of indigenous DNA) that critical voices made their point.

INMEGEN and the search for Genomic Sovereignty in Mexico (2001-2009)

> As a consequence of ethnic and geographic differences between allelic frequencies amongst persons and even whole populations, both [individuals and populations] could be exposed to ethical dangers. Actions that go against the most basic ethical principles are already becoming possible, and these dangers will increase exponentially as the HGP [Human Genome Project] reaches its end (IFS 2001:10).
>
> Mexico has a population of *unique* genomic makeup as a result of its history (Jimenez-Sanchez 2002: 32; emphasis added).

After 18 months of negotiations inside the Mexican Congress, the Mexican Institute of Genomic Medicine (INMEGEN) became the country's eleventh National Institute of Health on April 24th 2004. It was finally funded with more than 120 million dollars for its first 5 years of existence (see López-Beltrán, Vergara-Silva & García-Deister 2014; Schwartz-Marin 2011). According to the presidential decree mandating its creation, the duty of INMEGEN was to "promote, regulate, foster and practice the research and medical applications derived from the knowledge of the human genome" (D.O.F., 2004: Article V-bis). The decisive support of the Congress was accompanied by claims that there was a "biological uniqueness" inherent in the Mexican nation that needed urgent legal protection. This claim was publicly sustained by invoking historical experiences of dispossession, stressing the need to protect national interests against foreign exploitation:

> Great priority should be given to the collection and study of Mexican germplasm, by our own scientists, without hindering international collaborations; but avoiding at all costs that this national resource becomes appropriated and used in an almost exclusive fashion by foreign researchers as has happened before in archaeology, botany or zoology (INMEGEN Feasibility study [IFS], 2001: 25).

In response to what congressmen and scientists thought could be the most likely threats released by the new genomic era, a political and legal ethos known as 'genomic sovereignty' was designed to avoid the unlawful appropriation of Mexican DNA. The idea behind genomic sovereignty was that, with the completion of the Human Genome Project (HGP), the commoditisation of genetic information was now possible. This meant genomics could become a tool to oppress possible consumers and citizens in developing or emerging economies. Previous examples of colonial exploitation of Mexico's biological resources, including the cultivation of Barbasco for the

production of synthetic steroids by the Syntex pharmaceutical company (see Soto-Laveaga 2009), figured prominently in the new discourse of genomic sovereignty.

In Mexico, biocoloniality thus involved the mobilisation of a colonial history – including longstanding concerns about national autonomy and unsuccessful efforts to become an actor in the global scientific arena – and the invocation of possible colonial futures, along with the framing of a distinct national genetic heritage. In contrast to the Colombian case, however, it was not critical voices but scientific and political elites who summoned these ideas in order to support and extend a nationalistic version of genomic research. Thus Dr. Gerardo — founder and first director general of INMEGEN — said that genomic sovereignty was a concept developed to avoid foreign researchers coming to the country to "plunder indigenous blood and samples" (Interview 2008). In other public venues he also defended the notion of genomic sovereignty as a guiding principle to share and promote the benefits of genomic medicine with indigenous communities (Jimenez-Sanchez, presentation at the Academia Nacional, July 2nd, 2009). Similar sentiments pervaded the lobbying process in Congress, which constantly mobilised the idea that the genetic heritage of the Mexican nation was an asset, a 'national resource' in the new bioeconomies (OECD 2006). This discourse was also notably racialised, sometimes exalting the strong indigenous roots of Mexicans and at other times showcasing the unique patterns of racial admixture (Schwartz-Marin 2008, 2011). A quotation taken from one of the speeches given in the Congress by Marcia Muñoz —advocate and lobbyist for INMEGEN — provides a clear example of this negotiation strategy:

> you saw the potential that lies in the Mexican population, because of its indigenous origins...as genomes are more concentrated, they possess more research value [...] Mexico has to define the profile of its populations and also of its values...if there is not an appropriate legislation, imagine what would happen if a laboratory came to patent that valuable knowledge and take it to other places, taking away also indigenous genes [...] as science moves forward, legislation is needed (Muñoz in Canal del Congreso 2002).

This construal of genomic sovereignty and genetic uniqueness proved to be a successful lobbying strategy. The first step towards achieving sovereignty was the creation of INMEGEN in 2004. As one commentator declared:

> A Mexican genomic platform is considered key to discouraging non-Mexican research and development of Mexican-specific products and services. Anecdotal reports indicate that U.S. field workers have, in the past, collected blood samples from Mexican indigenous populations and taken the samples back to the United States. Presumably, polymorphisms could be identified and genomic-specific medicines made and sold at U.S. prices. If this were to happen, Mexicans would likely not be able to afford the drugs, thereby worsening economic and inequity problems that already exist. (US-NRC 2005: 10-12).

This was quickly followed by the inception of a programme to produce a genetic map of Mexican mestizo difference. Despite a generalised rejection amongst geneticists and biomedical scientists of the existence of a discrete 'Mexican genome', the Mexican Genome Diversity Project (MGDP), launched in 2005 in order to produce a catalogue of genetic variation to serve national interests, effectively brought this concept into common usage.

Research for the MGDP soon gave additional impetus to concerns about genomic sovereignty. According to top officials and in-house bioethicists, it was during the Mexican Genome Sampling Journeys that they found out that the privately funded Genographic Project – a 'genetic anthropology' venture run by the National Geographic Society – had been giving "Tupperware" and a few dollars to indigenous communities in exchange for their blood samples (field notes, December 2008). Another source of political and commercial anxiety was the patent permission requested from the Mexican office of intellectual property by Myriad Genetics on BRCA 1-BRCA

2 genes, a question that stirred fears of biocolonialism: "It was not only the plundering of indigenous communities but the hegemony of one nation over another for the genomic knowledge, taking shape with concrete examples, products and populations!" (Jimenez-Sanchez, interview 2008).

As a concrete response to these threats, in 2008 the Mexican Congress passed the so-called law of Genomic Sovereignty in a record time of 6 months. The move from a diffuse relation between national security and Mexican uniqueness to a law embedding sovereignty in the genetic material, available in "corpses, blood samples or human tissue" (D.O.F. 2008), was a pragmatic response to biopiracy, or what the INMEGEN calls Safari Research. On INMEGEN's web page the intentions of the law were explained as follows:

> [the law] recognises that national sovereignty must include everything related to the genetic material of Mexicans. Therefore, in the light of the misuse of information it is very important to prevent the biological material and information derived from it from being transferred outside the country without regulation (www.inmegen.gob.mx; last consulted on the 10th of March 2011).

Strikingly, such measures resulted in further disagreement over just what was meant by 'sovereignty'. For experienced policy makers and international figures such as Dr. Julio Frenk Mora— former Mexican Secretary of Health— the search for sovereignty was actually to be found in a cosmopolitan ethos of international cooperation and mutual legal responsibility (Frenk-Mora, interview 2009). For others, however – including scientific bodies, former members of the INMEGEN, and the ETC group – the idea of sovereignty, including the prickly question of who was really getting a benefit— was much less clear. The ETC group had been active in Mexico since the 1970s, particularly in matters of bio-prospecting, indigenous knowledge and green biotech (cf. Hayden 2003). As soon as INMEGEN's MGDP was announced, the ETC dubbed this another "vampire project". The relationship of INMEGEN with transnational enterprises and its ties with the National Foundation for Health (FUNSALUD), the largest private health-related think-tank in Mexico, strengthened ETC's suspicion. For the ETC, the discourse of Mexican sovereignty was just a mask for a non-altruistic enterprise in which Mexican geneticists were plundering the indigenous genetic heritage of the country, with the help of transnational pharmaceuticals:

> I do not know what they mean by 'Genomic Sovereignty', but evidently what there is, is an interest of great corporations [...] the genes are indigenous and the results are all transnational! Those projects have not benefited—and will not benefit at all—indigenous populations. But, on the other hand, the researchers have benefited themselves through publications, academic credits and scholarships, and the institutions have got the justification to ask for more public resources. In both cases they produce information that is later capitalised by the pharmaceutical corporations (Silvia Ribeiro [ETC researcher in Mexico and Latin America], interview 2008).

Artemio Cruz (pseudonym)—designer of the law and former founding member of INMEGEN— as well as various scientific groups, also argued that the law was a tool for manipulating and monopolising genomic research, since a fundamental clause dealing with intellectual property was absent (Schwartz-Marín & Arellano-Mendez 2011).

Regardless of the position taken towards the possible uses of human genetics, however, the processes of racialisation that are central to biocoloniality were already present from the moment when political actors in the Mexican genomics arena accepted that a "genetic patrimony" lies in the genomic structure(s) of a *national* population (mestizo and/or indigenous groups). In the Mexican case, biocoloniality, involving the articulation of a racialised Mexican uniqueness, is apparent as

much in efforts to formulate a scientific and legal defence of Mexican national autonomy as in more obviously biocolonial threats to that autonomy.

Biocoloniality and the racial construction of genetic patrimonies

Research into 'genomic sovereignty' policies in the global south makes clear that, regardless of whether we consider Mexico (Schwartz-Marin & Arellano-Mendez 2012), South Africa (DeVries & Pepper 2012), or India (Egorova 2010), the genomic criteria to delimit the boundaries of Mexican DNA, African genetics or Indian castes are elusive, if not impossible to find. Adopting a global perspective, Ruha Benjamin (2009) describes 'genomic sovereignty' policies as processes of strategic calibration in which proponents try to make socio-political and biological categories coincide, in order to construct their own national biomedical niche markets. Our genealogical analysis of the Mexican and Colombian cases in terms of biocoloniality suggests a broader perspective. Although the HE and the MGDP projects developed in very different historical and socio-technical contexts, the constitution of 'genetic identities' was not limited to what their proponents wanted to do with them in order to accumulate cultural or monetary capital. In each of these very different case studies, we can see how biocoloniality not only limited and shaped scientific enquiry, including the boundaries of genetic populations; it also shaped the character of political disputes and governance regimes. Genomic studies in Colombia and Mexico deployed concepts of population - indigenous people, Europeans, Africans, mestizos - that were open to racialised readings (indeed the term *raza* was used occasionally by some HE scientists in the early 1990s) and these categories brought with them a baggage of colonial history.

Although both projects were dubbed "vampire projects" by the ETC (despite very different uses of informed consent practices, scientific aims and technological capabilities), the way in which race and nation were coupled in each nation-state provided very different grounds to fight 'biopiracy' or defend indigenous rights. Thus, in the Colombian case, the deleterious effects of *mestizaje* on the genetic patrimony of isolated populations was presented as an argument for the creation of an Amerindian biobank, producing a "salvage genetics" to preserve the diversity of the nation and the "uniqueness" found in its indigenous communities (Barragán 2011:53). However, the multiculturalist turn in the Colombian constitution of 1991 and the weight placed on expeditions to "isolated communities" by the GHE made it possible to open up disputes in which indigenous groups were recognized as the owners of a certain genetic heritage, leading to the demise of the Amerindian biobank project. In the Mexican case, by contrast, *mestizaje* was represented as a positive asset: in the post-Human Genome environment in which the MGDP unfolded (2004-2009), medical genetics was rhetorically mobilized as a concrete way to protect both the *mestizo* and indigenous genetic heritage of the nation. The public appropriation of the 'unique' genetic patrimony of the Mexican *mestizo* nation by its own government and scientific elites was thus represented as a way to reverse the power relations in which 'developed countries' would sell medicines and biomedical products to the passive markets in the global south (Jiménez-Sánchez 2002). This nationalistic and sovereign discourse made it possible to make an extensive sampling of Mexico's indigenous communities without any major setback, despite open opposition from indigenous activists.

Something of the strong nationalist sentiment informing Mexican genomics is recognizable in the answer given by Dr. Jimenez-Sanchez when asked about the special rights and protection of indigenous communities: "the protection is the same; finally they are Mexicans, the same as us" (interview 2008). This statement would fit less easily in Colombia, in which there is a strong racial-regional grammar of difference. In the words of the founding figure of Colombian genetics, Emilio Yunis- unrelated to the GHE (interview 2012):

> Colombia is an ethnic mosaic, a country composed of various nations: one white, another black —in the coast—, the indigenous one— living in reservations— and the mestizo one

> [...] regarding the HE, I do think there is a genetic indigenous patrimony, and that is why I defend the fact that indigenous communities should regulate research according to their laws and customs.

In sum, the language of racialised regions has become a major prism to represent the Colombian nation (Wade 1991), while in Mexico a more homogenising Mestizo identity —albeit highly charged with indigenous symbolism— has historically taken root (Basave Benítez 1999). In both cases, however, the stubborn racialisation of national imaginaries testifies to the extent to which the coloniality of power (Quijano 2000) has been present in the making and disputing of genetic populations in Latin America, but also presumably throughout the global south.

Thus, conscious of how global markets and capitalist machinery intertwine with the production of biomedicine and genetics research, in both Mexico and Colombia ideas about ethno-racial, national and/or geopolitical alterity have been mobilised to face what scientific elites and their public opponents have framed as a competitive struggle for the genetic structures of populations (sometimes meaning "races", ethnic groups or nations). In both Mexico and Colombia, 'genetic identities' and their potential value have played a powerful role in the consolidation of research agendas and the quest for funding. At the same time, key scientists, indigenous groups, the ETC and policy makers in both Mexico and Colombia have emphasised the potential of genetic bioprospecting and biopiracy for reinforcing the scientific and commercial domination of the global north in the emerging genetic markets. However, when talking about issues of 'biopiracy', both critical and scientific voices (unreflexively at some times and strategically at others) leave out of the question the racialised categories which are evoked by the disputes on human genetics. By drawing attention to this silence, we render visible the workings of biocoloniality.

Drawing on the analytical perspective of coloniality of power (Quijano 2000), the category of biocoloniality thus adds depth and complexity to bodies of literature that operate with notions of biopolitics that have not been provincialised (Chakrabarty 2000) or decentred. In stark contrast to what Nikolas Rose (2008) identifies as the biopolitics of advanced liberal democracies, in which autonomous citizens seek to administer and improve their vitality, in Mexico and Colombia there is a tendency to link the vital components of 'ethnic', 'racial' or 'national' groups to the global political economy of biomedical-genetic research. Seen through the optic of biocoloniality, the *polities* [US and the EU] that Rose (2008) identifies as advanced liberal democracies belong to a larger global framework in which 'biopiracy' is an issue that cannot be simply 'othered'. Biocoloniality therefore recognises that the global network in which genetic research has gained meaning reveals that "there is not a singular 'politics of life' but a multiple politics with inequalities, opportunities, complexities, and dilemmas both individually and collectively, which require a more nuanced exploration" (Raman and Tutton 2010:730).

Against genetic identities: biocoloniality and its implications in political imagination

Notions of genetic 'uniqueness' have loomed large in efforts to protect and defend genetic patrimonies, despite the fact that, in practice, both scientific and legal experts have been unable to define unequivocal criteria for delimiting such uniqueness (De Vries & Pepper 2012; Schwartz-Marin & Arellano-Mendez 2012). This has led some scientists – including some of those involved in population genetic research in Mexico and Colombia – to express concern about the way in which such efforts have been framed. Thus, for instance, some see the law to protect "The Mexican Genome" as deeply problematic because there was no way to define in practical terms what was to be protected. In the words of Dr. Irma Silva-Zolezzi (interview 2009), first author of the MGDP:

> It is technically feasible to speak of sovereignty when we speak about an individual genome, which is *unique*; but to speak of sovereignty over the genome of a whole population is pretty difficult. We cannot speak of a unique Mexican genetic structure,

> when we are talking of shifting percentages of DNA fragments which are shared by humanity and various populations across the world.

In Colombia, Dr. Alberto Gómez —a leading scientist in the HE — affirms that notions such as race or categories such as 'Afrodescendance' lack any scientific grounding, since races cannot be defined genetically and we all come from Africa. He also states that human populations should not be represented in terms of percentages of genetic ancestry since a population is by definition in constant flux (Gómez in field notes, March 2012). Consequently, twenty years after the HE began, leading scientists from this project have questioned their former research categories. Reflecting back on the controversies around the HE, Dr. Jaime Bernal —leader of the project and founder of IGH-PUJ— thinks that "the sacralisation of genes", i.e. the idea of genes as bearers of the ultimate truth and secrets of humanity (interview 2011), has been a negative issue at the centre of the disputes on human genetic research.

Despite such dissenting voices, public debates about the protection of genetic patrimonies from neo-colonial exploitation in an emerging biomedical market have continued to be built around the idea that indigenous, black or national *mestizo* populations may possess unique genetic properties. Many of the scientists concerned are unable or unwilling to destabilise the idea that genetic populations roughly correspond to nations, ethnic groups or, occasionally, races in the public realm. Once debate about protecting genetic patrimonies moves into the public realm, scientists and legislators alike tend to speak as if genetics possesses the indisputable power to differentiate races, individuals, populations and even nations. Biocoloniality, and its rather limited ontological and epistemological repertoire, continues to dominate our political and scientific imagination.

Thus in Mexico, the idea that research on human genetics was the ultimate tool for identifying indigenous populations in the interest of medical and economic development was extensively and strategically mobilised in the Mexican Congress by the advocates of INMEGEN (IFS 2001: 10-25), constituting a regime in which genetics, *mestizaje* and nation were strongly coupled in public discourse (Schwartz-Marin 2011; Schwartz-Marin & Silva-Zolezzi 2010). There was tacit agreement, even among the scientists who openly criticised the idea of a "Mexican Genome", that such language made it easier for congressmen to understand the political import of human genomics. This led to the "sacralisation" of genetics being written into the legislation preceding the creation of the INMEGEN:

> With this the idea is to protect only that which is most intimate, which is genetic heredity, from external aggression by racist groups and mad personalities, or from multinational entrepreneurs without scruples, ready to savagely speculate with the most sacred [part] of the human being: its genetic heredity (Patiño in D.O.F. 2001).

In the Colombian case, the controversy around the HE led to new legislation on informed consent and "the manipulation of genes", in large part because genes were thought to be an intimate element of human nature, which in the case of indigenous groups (according both to geneticists and to their opponents) provided a unique biological signature of humanity's ancestors.

Such insistence on understanding and ordering the world through a racial matrix reproduces well-known divisions and colonial struggles for property, control and justice. As TallBear and Reardon (2012) have stated in a recent paper exploring the role of whiteness as property in genomic research, US scientists' practice of ownership and sharing of indigenous tissue samples reinforces "white" privilege. However we should be as critical of the reification of race [and its consequences] in the public realm as in laboratories: NGOs, indigenous representatives and critical voices too readily accept that there is a Havasupai, Tepehuano or Inca DNA. Does avoiding racialisation and the reification of DNA mean we should accept a universalising discourse in which the scientists that own the genetic sequencers can profit from, and freely study indigenous communities as they

please? Our answer is an emphatic "No". There are ways to build a more balanced relation between genetic science and indigenous communities, beyond those that geneticise collective identities.

First, we need to recognise the technical and ethical impossibility of isolating and defending indigenous, national or racial genes – as do many genetic scientists nowadays. We also need to recognise that the characterisation and valorisation of 'indigenous' DNA does not proceed in geographical isolation, but depends on dialogues with the many population DNA databases that exist around the globe, including those in the global north. Once this is understood, we will not need to waste any more precious time trying to police and control 'indigenous' DNA. Rather, we need to look for more horizontal relationships between genetic scientists and the communities that participate in their studies, beyond those that sacralise genetic heritage.

Most importantly, there is an urgent need to develop serious and robust governance mechanisms for genomic research. At the moment both Mexico and Colombia lack independent bioethical bodies to deal with these matters. In Colombia, while there are indigenous representatives in the Congress, twenty years after the HE project finished no advances have been made to put the law regarding informed consent into practice. In the case of Mexico, INMEGEN's central role in genomic research and the design and sanction of the law on Genomic Sovereignty have only fuelled a generalised competition to control samples amongst scientists. This leaves to one side the main preoccupation behind the creation of the INMEGEN and the law on Genomic Sovereignty, which was to make population genetic science a public health resource.

The relations between modernity and colonialism emerge not only as violent practices of domination and subjugation, but are present in the very categories we use to understand and dispute our world. In the field of population genomics, one of the main difficulties comes from the very communication strategies scientists and their audiences (some of them extremely critical) use to refer to human genetic research, and the always-prickly question of what exactly constitutes a population. With almost 3,200 million base pairs in the human genome, the possibilities of making statistically significant groupings are much greater than just talking about African, Amerindian, Asian, Mestizo or European ancestries (see Fausto-Sterling 2005). The very fact that the genetic partition of human diversity is still conceptualised in terms of continental-racial groups, bears witness to the intricate relationship between science, modernity and sedimented notions of difference.

The modern constitution in which scientists are the only ones accredited to speak for non-humans or give voice to the natural world, while politicians and activist deal with passions, opinions and interpretations, has impoverished our political possibilities for far too long. Political alternatives of contestation would change drastically if, instead of thinking in terms of extracting "indigenous genes," activists and NGOs could destabilise and question the existence of such entities in the first place. How these political disputes will look in the upcoming future is a question that only experimentation can answer. In the meantime, the recognition and critical appraisal of the way in which biocoloniality operates in our world might help us in the construction of new political and scientific alternatives.

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